DOCUMENT RESUME

ED 159 590 CS 003 694

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TITLE An Analysis of Oral Reading Errors and Its Implications for Improvement of Reading Instruction. Technical Report No. 50.
INSTITUTION Kamehameha Schools, Honolulu, Hawaii. Kamehameha Early Education Project.
PUB DATE Feb 76
NOTE 23p.

EDRS PRICE MF-$0.83 HC-$1.67 Plus Postage.
DESCRIPTORS *Beginning Reading; Context Clues; Grade 2; *Miscue Analysis; *Oral Reading; *Phonics; Primary Education; Reading Processes; *Reading Research; Semantics
IDENTIFIERS *Reading Strategies

ABSTRACT

The oral reading errors of 15 second graders were analyzed to find out if strategies used by good and poor readers could be differentiated. Patterns of errors were identified, and it was found that good readers often used context cues, while poor readers relied heavily on visual-phonic information. It was also possible to identify good and poor readers by examining the percent of errors made in different categories. Possible differences between the KEEP (Kamehameha Early Education Program) students and subjects in other oral reading studies were noted: the KEEP students overall made more errors which did not fit into the context of the sentence. Finally, it was suggested that the KEEP children's curriculum should incorporate much more instruction in the use of context, since the study seemed to demonstrate that their skill in this strategy is not easily developed. (Author)

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An Analysis of Oral Reading Errors and Its Implications for Improvement of Reading Instruction

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ED159590

Technical Report #50

of

The Kamehameha Early Education Program

Kathryn H. Au

February, 1976

a research and development program established and funded by

The Kamehameha Schools/Bernice P. Bishop Estate

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The cooperation of the State of Hawaii Department of Education is gratefully acknowledged, as is the support and resources made available by the Sociobehavioral Research Group, MRRC, University of California, Los Angeles.

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Published by The Kamehameha Early Education Project, 1850 Makuakane Street, Honolulu, HI 96817

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The Kamehameha Early Education Program

The Kamehameha Early Education Program (KEEP) is a research and development program of The Kamehameha Schools/Bernice P. Bishop Estate. The mission of KEEP is the development, demonstration, and dissemination of methods for improving the education of Hawaiian and Part-Hawaiian children. These activities are conducted at the Ka Na'i Pono Research and Demonstration School, and in public classrooms in cooperation with the State Department of Education. KEEP projects and activities involve many aspects of the educational process, including teacher training, curriculum development, and child motivation, language, and cognition. More detailed descriptions of KEEP's history and operations are presented in Technical Reports #1-4.

Technical Report #50

An Analysis of Oral Reading Errors and Its Implications For Improvement of Reading Instruction

Kathryn H. Au*

The analysis of oral reading errors offers much promise for study of the reading process (Weber, 1968). In particular, oral reading error analysis may reflect the relative importance and usefulness of strategies associated with various stages of reading acquisition. Although they might be particularly revealing, few studies have explored differences in the oral reading errors made by good and poor readers. Weber's (1968) review of more then 30 studies of oral reading errors cited only two in this category. College students were the subjects in both studies, with test scores used to identify good and poor readers. Fairbanks (1937) and Swanson (1937) both found that the errors of good readers rarely changed the meaning of passages, whereas the errors of poor readers often did. Fairbanks also found that poor readers made six times as many hesitations as good readers and corrected only 7% of their errors, as opposed to 19% for good readers.

Clay (1967, 1969) studied the oral reading errors made by 100 New Zealand children, each followed for a year between their fifth and sixth birthdays. On the basis of scores on a word recognition test, children were categorized as High (H), High Middle (HM), Low Middle (LM), and Low (L). There were significant differences in the error ratios of the four groups; the median child in the high group made one error in every 37.29 words, as

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*Thanks to Lou Ann Wooddell and Doris Crowell for their assistance and advice.

compared to the median child in the low group, who made one error in every 2.58 words. The groups also differed in self-correction ratios, the H group correcting one in every three errors, the HM group one in four, the LM group one in eight, and the L group only one in 20.

Weber (1970) found that students in high and low reading groups in two first grade classes did not differ significantly in terms of percent of grammatically acceptable oral reading errors. However, while the low group did not correct 58 percent of errors that were not grammatically acceptable, the high group failed to correct only 15 percent of these errors.

Cohen (1975) analyzed the oral reading errors of 50 first grade children over a period of eight months. In the first months both good and poor readers showed many "no response" errors. Over the eight months, good readers progressed from the "no response" stage to one in which they made predominantly nonsense errors, and later to another characterized by many substitutions. Poor readers, over the same time period, showed a slower increase in nonsense errors concommitant with an increase in substitutions. Cohen found that poor readers continued to use letter cues, while good readers apparently developed an ability to use semantic cues.

In the present study, we investigated strategies used by good versus poor readers by analyzing the oral reading errors of a group of second grade students.

The data collected were examined for information bearing on the following questions:

1. Are patterns of errors evident? Significant correlations between different categories of errors would show that the children relied on certain identifiable strategies in dealing with difficult or unknown words. The assumption here is that the use of particular strategies will be reflected in consistant patterns of error.

2. What are the preferred strategies of good and poor readers? Good and poor readers, as measured by scores on the Gates-MacGinitie reading tests (1972), can be expected to differ in number or percent of errors made in certain categories. In particular, they may differ in the extent to which they rely on the use of context or visual-phonic cues.

3. When data for all children are grouped, do certain types of errors occur more frequently than others, and, if so, what implications are there for improving the children's reading program?

Method

Setting

A study carrel with high walls on three sides was set up against one wall of a classroom. The carrel was deep enough so that a child seated within it was not able to see outside, and could feel that he was in a separate space. A Sony TC-110A tape recorder was placed in the carrel. The microphone connected to the tape recorder had a remote switch which the children were taught to operate. All audiotapes were made by the children sometime during their regular morning reading class.

Stimulus materials

The materials were stories taken from three basal reading texts. all designed to be read at the beginning of second grade (My City from the Bank Street Readers, Enchanted Gates from the MacMillan Reading Program prepared by Harris and Clark, and More Power from the Scott-Foresman New Open Highways series). None of the materials had previously been used in the children's school. Each book was divided into four sections, and the first and last stories in each section were selected for use in the study. The stories were retyped so that all would appear in the same typeface and

format, and without any illustrations. The first two stories from each book were used, then the second two stories from all of the books, and so on. The pages of the story to be read each day were put in a three-ring binder which was placed in the study carrel next to the tape recorder.

In order to make an accurate comparison between good and poor readers, all children read the same stories. Any given selection was thus easier for some children to read than it was for others, and good and poor readers could be discriminated by their performances. An alternative method is to have the child read at his own instructional level, as Cohen (1975) did, but the problem with this approach is that distinctions between good and poor readers are obscured when children read at their own level. Presumably, when the proper instructional level is determined, every child is an "average" reader.

Subjects

The subjects were 15 part-Hawaiian second grade students in the top reading group of a combined first and second grade three-on-two classroom. Thirteen of these children were girls, two boys. All of the children were being taught with the Ginn 360 basal reader series. In this series, all were reading above the beginning second grade level, the level of the texts to be read, at the time the study began in the spring.

Procedure

On the first day of the study, the children's reading teacher read them a set of instructions that had been prepared by the experimenter. The children were informed that they would be going into the carrel one at a time to tape record their reading of the story they would find in the folder. A list of their names was posted on the outside of the carrel, and when a child had finished his turn, he was to call the next person on the list. The

use of the tape recorder was explained and demonstrated by the teacher. The children were also told that there would be times during the coming weeks when they would have a chance to listen to the tapes.

The only specific instructions regarding reading of the stories concerned dealing with unknown or difficult words. The children were encouraged to guess the word, and, finally, if they could not make a guess, to skip the word and go on. The instructions also emphasized that the teacher would not be able to help them with any of the words. These instructions were given to ensure an adequate sample of reading by each child because the children were accustomed to teacher prompting and assistance; it was believed that they might stop and not continue when they encountered words they were not able to identify by sight. The instructions were given only on the first day (data from the first day were not included in the analysis) and were not repeated although the study continued for two months.

Two changes were made after the study began. First, the amount of text was lessened to ensure that all children present would have a turn in the carrel each day. Second, the order the children followed in taking their turns was reversed during the last two of the eight weeks of the study to make certain that a sufficient number of readings by children originally at the end of the list was obtained.

Data collection. Only a selected portion of the story read each day was scored for analysis. The first two sentences of the page constituted a warm-up, and the next ten sentences immediately following were then scored for errors. Errors in reading any portion of the text other than these sentences were not scored.

A sample of ten days of each child's reading was scored. Stories from days on which there were acceptable readings from at least 10 of the 15

children were scored first. Then additional recordings by children for whom there was an insufficient number of readings were obtained from tapes for days on which there were acceptable readings by the largest number of these children.

Certain story readings were not deemed acceptable for scoring. Occasionally a child would skip, apparently intentionally, a number of sentences within the story; a story reading was not scored if more than two of the ten sentences had been skipped. A few children mumbled and slurred words when reading; if more than two sentences were inaudible to the scorer, that story reading also was not scored. In addition, if any of the ten sentences to be scored was cut off because of mechanical difficulties or the child's reaching the end of the cassette, these readings were not used.

In order to develop a system for categorizing the oral reading errors, data from a pilot test were analyzed and the most frequently occuring categories of errors were retained and more clearly defined. Elements of category definitions used by Biemiller (1970), Clay (1968), Kagan (1965), and Schale (1966) were incorporated. Errors were scored according to the code presented in Table 1. The categories are grouped according to whether the error made shows 1) use of context only, 2) use of visual-phonic information only, 3) both, or 4) neither.

Table 1

Code for Oral Reading Errors

1. Errors showing use of context only.

   a. Meaningful substitution

      The word substituted makes sense in the context of the sentence. It does not start with the same letter as the word in the text.

      Example: Today is Tuesday, read for Today is Wednesday.

b. Intrusion

An extra word, not in the text, but consistent with the context of the sentence is added: Example: I bought some candy for I bought candy.

2. Errors showing use of visual-phonic information only.

a. Partial identity substitution--nonmeaningful

The word substituted begins with the same letter as the word in the text but does not make sense in the context of the sentence.

3. Errors showing use of both context and visual-phonic information.

a. Partial identity substitution--meaningful

The word substituted begins with the same letter as the word in the text and also makes sense in the context of the sentence. Example: Bill is here, read for Bill is home.

b. Self-correction

A mistake is made and then corrected or parts of a word are attempted before the whole word is read correctly.

c. Repetition

The word in the text is read correctly first and then repeated. Stutters or partial re-reading of the word are not counted. Every complete word repeated is counted as one error and scored only if less than a sentence repeated. Repetition has priority over hesitation if both occur.

d. Hesitation

There is a pause of at least five seconds before the word is read, but it is eventually read correctly.

4. Errors showing use of neither.

a. Nonmeaningful substitution

The word substituted does not make sense in the context of the sentence and also does not start with the same letter as the word in the text.

b. Omission

A word is deliberately or accidentally omitted, or the word is inaudible. Omissions are not scored if there is a possibility of scoring another category.

Only one error was scored for each word in the text. For example, if a child repeated a word more than once, only a single repetition was scored. If different types of errors were made on the same word, only the first error made was scored. Thus, if the child made a nonmeaningful substitution and then changed his reading of the same word to a partial identity meaningful substitution, only the first error (the nonmeaningful substitution) was scored.

Each reading was scored by two of the three persons trained in the use of the code for oral reading errors. The protocols were then compared and discrepancies resolved by discussion if the two scorers had recorded the same error but disagreed on its proper categorization, or by relistening to the tapes to settle disagreements about whether or not an error had occurred.

Data analysis. After ten samples of each student's oral reading had been scored, the number of errors per child in the nine categories was computed, as well as the total number of errors made. Individual subject's oral reading errors were also converted to percentages of total errors represented by errors in each of the nine categories. This conversion was made in order to represent more accurately the performance of the children who made few errors overall.

Results and Discussion

Correlations between categories of errors

Total errors made by subjects in the nine categories were correlated to reveal relationships among the categories. Partial identity nonmeaningful substitutions were found to be correlated with errors in three categories: nonmeaningful substitutions (rho=.92, $p<.01$), partial identity meaningful substitutions (rho=.71, $p<.01$), and omissions (rho=.54, $p<.01$). There was also a high correlation between nonmeaningful substitutions and partial identity meaningful substitutions (rho=.75, $p<.01$). Another group of error categories among which significant correlations were found centered around hesitations, which were related to repetitions (rho=.53, $p<.05$) and meaningful substitutions (rho=.52, $p<.05$).

The kinds of errors found in the first group of categories (partial identity nonmeaningful substitutions, partial identity meaningful substitutions, nonmeaningful substitutions, and omissions) all reflect absence of the use of context cues. On the other hand, errors in the second group (hesitations, repetitions, and meaningful substitutions) show effective use of context. Although use of visual-phonic information may play a part in hesitation and repetition errors, errors in these two categories are still consistent with the context of the sentence. In fact, hesitation and repetition errors show that a child is able to resolve a problem without altering the text, although he may have some initial difficulty.

When the data were analyzed by percent of errors in the different categories, only one significant correlation was found, a negative relationship between self-corrections and omissions (rho=-.45, $p<.05$). This result shows that children who corrected a high percent of their own errors rarely made omissions, and vice versa. Children who had the ability

to make self-corrections apparently made consistent use of this strategy, while children who possessed this ability to a lesser extent tended simply to omit many words in the text.

In summary, examination of significant correlations among categories revealed three patterns of errors. The first pattern reflected a strategy centered on the use of visual-phonic information, while the second one centered on the use of context cues. Finally, the only significant negative correlation showed that children were consistent in using either a strategy of self-correction or omission, but not both.

Differences between good and poor readers

The subjects were divided into two groups, according to whether their total score on the Gates-MacGinitie Reading Test, Primary B, fell above or below the mean for the group ($\bar{X}$=43.60, s=6.23, the range was from the 3.9 to the 1.3 level in vocabulary, from the 4.3 to the 1.5 level in comprehension). The eight children whose scores were above the mean were grouped together as "good" readers, while the seven whose scores were below the mean made up the "poor" readers. The data were then analyzed to determine whether the good and poor readers as groups differed in percent of errors made in the nine categories. Because of the small size of the sample, both parametric (independent t-test) and nonparametric tests (Mann-Whitney U) were used. Significant differences were revealed in the percent of errors made by good and poor readers in the categories listed in Table 2.

The results indicate differences in the reading strategies favored by good and poor readers. Poor readers tended to rely on visual-phonic information, as seen in their significantly higher percentage of partial identity nonmeaningful substitutions (t=-2.44, $p<.05$). They differed from good readers even more in percent of omissions (t=-2.87, $p<.02$), often showing a lack of any effective strategy. The most significant difference between the two groups was in

Table 2

Comparison of Errors Made by Good and Poor Readers

Category of Error	Good Readers' Mean Percent	Poor Readers' Mean Percent	t (df=13)	p	U (n_1=7, n_2=8)	p
Partial identity nonmeaningful substitutions	15.20	26.42	-2.44	.05	9	.014
Repetitions	19.03	10.90	----	----	13	.047
Omissions	10.61	29.97	-2.87	.02	8	.010
Self-corrections	23.12	9.92	3.99	.01	5	.003

percent of errors self-corrected (t=3.99, $p<.01$). Good readers frequently corrected their own errors, but poor readers rarely did so. Good readers also made significantly more repetitions (U=13, $p<.047$). Repetition errors apparently mark places in the text where good readers experience momentary difficulty, which they quickly resolve.

The data were further analyzed to determine whether good and poor readers, as previously defined, could be discriminated by looking at percentages of errors made in the nine categories. For this purpose the children were divided into high and low groups for each category, determined by whether they had a higher or lower percentage of errors than the group mean for that category. The total Gates scores of the subjects in the resulting groups were then compared to see if there was a significant relationship between children high or low in specific error categories and children high or low in level of reading achievement. Categories in which significant differences were found are shown in Table 3.

The process evidently works in reverse as well, because good readers can be discriminated from poor readers by looking at the percent of oral reading errors made in the three categories below: partial identity nonmeaningful substitutions, omissions, and self-corrections.

Table 3

Category of Errors Discriminating Between Good and Poor Readers

Category	Group Mean %	High Group Mean %	Low Group Mean %	t (df=13)	p*	U	p*	# of highs	# of lows
Partial identity nonmeaningful substitutions	20.67	39.71	47.00	-2.73	.02	9.5	.02	7	8
Omissions	19.65	38.00	47.33	-4.21	.001	0	.002	6	9
Self-Corrections	16.97	47.11	38.33	3.68	.01	1.5	.002	9	6

*two-tailed

Use of context and visual-phonic cues

Categories were combined to determine the percent of total errors which showed use of context, or were consistent with the context of the sentence. Errors in the following categories fit this criterion: meaningful substitutions, intrusions, partial identity meaningful substitutions, self-corrections, repetitions, and hesitations. When errors in these categories were grouped together, they accounted for 45.13% of all errors made. Good readers, as previously defined, showed use of context in 71.52% of their errors, while poor readers used context in only 37.58% of their errors, a highly significant difference ($t=6.91$, $p<.001$).

Percent of total errors showing use of visual-phonic information was found by combining the two kinds of partial identity errors. This showed that the children used visual-phonic information in 38.19% of their errors, with 17.82% of good readers' errors and 32.41% of the poor readers' errors occurring in the partial identity categories. Again the difference between the two groups is significant ($t=-2.72$, $p<.02$).

This percent of total errors showing use of context, 45.13%, is extremely low when compared to the findings of Clay (1968) and Weber (1970). Clay reported that 72% of all substitutions made by her sample of New Zealand first graders were grammatically acceptable. Weber compared the oral reading errors of children at different levels of reading achievement in two first grade classes in terms of use of preceding verbal context. In the first class the high group showed use of context in 92.31% of their errors, the low group in 88.91% of their errors. In the second class the percentages were: high group, 87.5%; middle group, 87.0%; and low group, 89.4%.

Even given some differences in the way errors were coded and data analyzed in these two studies and the present one, the KEEP children, a

year or more older than subjects in the Clay and Weber studies, almost certainly show much less reliance on contextual cues. In contrast, the percent of errors showing use of visual-phonic information, 38.19%, is comparable to the 41% figure repeorted by Clay (1968).[1] The main difference in reading skills between the KEEP students and the subjects in these other studies appears to lie in proficiency in using context. Exactly why the KEEP students appear to be so much less skilled in this respect is not clear. Although one major factor is that their reading curriculum was one which emphasized decoding skills, the two classes studied by Weber also used curricula which covered many such skills.

Types of errors and teaching implications

Table 4 shows the mean number of errors in each category, across all subjects. The first five types of errors--omissions, partial identity nonmeaningful substitutions, partial identity meaningful substitutions, repetitions, self-corrections--occurred with much greater frequency than errors in the last four categories.

The mean percent of errors in each category for all subjects is listed in Table 5. The figures were derived by summing the errors in each category for individuals across the ten readings scored, and then finding the percent of total errors by that subject accounted for by errors in each category. Percentages for all subjects were then grouped and mean percentage figures computed. Once again, the same five types of errors predominate, although not in exactly the same order as when data were analyzed before conversion

[1]Clay's criteria for classifying errors in this area were much broader than those used in this study. The partial identity categories used here included only errors which began with the same letter as the word in the test sentence, while Clay's criteria included errors with the same beginning, ending, or medial letters as the word in the text, as well as errors in which the word in the text was reversed, or in which the first letter of the error was the same as the last letter of the word in the text.

Table 4

Mean Number of Errors by Category

Omission	37.47
Partial Identity Nonmeaningful	32.27
Partial Identity Meaningful	21.00
Repetition	19.47
Self-Correction	18.47
Nonmeaningful Substitution	6.80
Meaningful Substitution	2.47
Hesitation	1.07
Intrusion	0.47

N=15

Table 5

Mean Percent of Errors by Category

Partial Identity Nonmeaningful	20.67
Omission	19.65
Self-Correction	16.97
Partial Identity Meaningful	16.19
Repetition	15.23
Nonmeaningful Substitution	3.94
Meaningful Substitution	2.18
Hesitation	2.04
Intrusion	0.79

N=15

to percentages.

The data in Tables 4 and 5 show a predominance of omissions, partial identity nonmeaningful substitutions, partial identity meaningful substitutions, repetitions, and self-corrections when data for all subjects are grouped by total number and by percent of errors made in each category. Overall, this group of children would probably benefit if more time were devoted to teaching them to use context cues more effectively. Most understand how to use visual-phonic information, but in contrast have little skill in using context. Once this context strategy is strengthened through instruction, more guessing of words using both context and visual-phonic cues could be encouraged, thus reducing the number of omissions. This combination of strategies approach has been advocated by Smith (1973).

The prevalence of repetitions and self-corrections can be interpreted as a favorable sign. Both show that the child might have been experiencing some difficulty with the text, but ended in making only a minor error since the mistake would in no way have changed the meaning of the written text.

Conclusion

An analysis of oral reading errors of a sample of part-Hawaiian second graders revealed consistent patterns of errors, as well as differences in the strategies used by good and poor readers. In general the results confirmed the findings of other investigators (Fairbanks, 1937; Swanson, 1937; Weber, 1970; and Cohen, 1975) that good readers were more skilled in the use of context. Cohen's (1975) finding that poor readers relied on letter cues, rather than context, was also supported. In addition, good readers corrected a significantly higher percentage of errors than did poor readers, as reported by Clay (1967, 1969). However, differences in percent of errors showing use

of context made by the subjects of this study and those in the Clay and Weber studies were apparent. Finally, the information provided by the oral reading error analysis led to suggestions for improving the children's program of reading instruction.

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